**LUCY'S WARBLER (*Vermivora luciae*)**

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**Criteria Scores**

| Population Trend | Range Trend | Population Size | Range Size | Endemism | Population Concentration | Threats |
|---|---|---|---|---|---|---|
| 10 | 0 | 5 | 10 | 0 | 0 | 5 |

**Special Concern Priority**

Third Priority; listed by virtue of its declining population (PT=10) and relatively small range (RS=10) and population size (PS=5) within the state. Not listed in the original Bird Species of Special Concern in California document (Remsen 1978), though it was a proposed candidate species; recovery from drastic population declines along the lower Colorado River and expansion of breeding range north and west in the California deserts were main factors in failure to make the original BSSC list (or its 1992 revision), though rapid disappearance of mesquite brushlands habitat was cited as a potential concern.

**Breeding Bird Survey Statistics for California**

Data inadequate for trend assessment (Sauer et al. 2000).

**General Range and Abundance**

Monotypic, restricted range species, breeding only in sw. United States (Arizona, s. New Mexico, extreme s. Nevada and Utah, and se. California) and adjacent northern Mexico. Relatively recent arrival in New Mexico, first recorded in 1907 and since spreading through the southwestern part of the state, where now common (Stoleson et al. 2000); there, densities range from 1.7-3.3 pairs/ha. Winters almost exclusively in Mexico, along the Pacific slope from extreme s. Sonora (uncommon; Russell and Monson 1998) to Guerrero and more rarely to the Isthmus of Tehuantepec (Howell and Webb 1995), though no Oaxaca records cited by Binford 1989. No information on more specific

winter range of California breeding population. Recorded as vagrant as widely as Idaho in spring, Louisiana in early winter, and, exceptionally, Massachusetts in December (Dunn and Garrett 1997).

**Seasonal Status in California**

Breeding summer visitor and rare fall and winter vagrant. Arrival in California usually "mid-March" (Grinnell and Miller 1944), though some birds arrive early in the month (Garrett and Dunn 1981). Along the lower Colorado River Valley arrives "en masse" in first half of March, coinciding with the leafing out of honey mesquite (Rosenberg et al. 1991). In larger context of western North America, Russell and Monson (1998) refer to the abrupt arrival of large numbers in Sonora 10-15 March, and arrives en masse in sw. New Mexico during third week of March (Stoleson et al. 2000). Most depart the California breeding grounds by mid-July, but some remain to September (Rosenberg et al. 1991). One southwest of Brawley, Imperial Co., on 14 July 2001 was undoubtedly a fall migrant (Patten et al. 2002, G. McCaskie pers. comm.), demonstrating how early species moves in fall. In New Mexico few birds recorded after early July, and last detections in August (Stoleson et al. 2000); fall migrants pass through Sonora mainly from late June to early September (Russell and Monson 1998).

Rare but regular fall migrant and winter visitor away from breeding areas in the state. On Mojave Desert of eastern Kern County recorded as casual migrant, with six fall records from 19 July to 9 August (M. T. Heindel, in litt.), again demonstrating how early fall migration can be; there is also a spring record for that area (18 May 1991; AB 45:497). Vagrant, mainly late August through February, on the coastal slope of California , with records north to Humboldt County (Garrett and Dunn 1981, Harris 1996); exceptionally once in winter north to Oregon (Gilligan et al. 1994). Such occurrences represent an insignificant portion of the species' population, and need not be further considered here, though patterns of vagrancy may mirror overall population trends or cycles (Patten and Marantz 1996) and are therefore of some potential interest in monitoring.

**Historical Range and Abundance in California**

Grinnell and Miller (1944) record the distribution of this species in California as including the length of the Colorado River Valley. They considered it common, but indicated that range and population reductions were already evident due to destruction of mesquite thickets; indeed, much earlier in the 20th century Grinnell (1914) attributed the loss of this species along the lower Colorado River between Picacho and Pilot Knob to cutting of honey mesquite for firewood. This species possibly bred at that time in the Imperial Valley; a singing male with enlarged testes was collected 8 April 1909 at Silsbee [= Seeley] (Grinnell and Miller 1944). In the Coachella Valley, Riverside Co., a female collected in mesquite woodland near Mecca on 29 March 1911 (Grinnell and Miller 1944) suggested breeding there as well. Dawson (1923) suggested that a Coachella Valley breeding population would have been only a remnant, given the loss of mesquite habitat there; in fact, he predicted the loss of this species altogether in California with continuing destruction of mesquite bosques.

Just outside California, Russell and Monson (1998) termed the species "formerly common" in Colorado River delta portion of Sonora, but its present status in the delta is uncertain. In w.-c. Arizona, declines along Gila River were noted by Rea (1983); it was formerly "common" there, but few nesting pairs were noted in the 1970s.

The historical status in California west of Colorado River, away from the Imperial and Coachella Valleys, is unknown.

**Recent Range and Abundance in California**

Rather common locally along the Colorado River, with small localized populations occurring west to the Borrego Valley, San Diego Co., and north to Furnace Creek Ranch in Death Valley National Park, Inyo Co. This represents an expanded geographical area compared to the range as outlined by Grinnell and Miller (1944), but overall numbers are probably lower at present than in the first half of the twentieth century.

*Lower Colorado River*: Widespread habitat loss in and prior to the 1950s along the lower Colorado River caused declines, but there has been considerable recovery since that time (Rosenberg et al. 1991). Here Lucy's Warblers occur both in river floodplain riparian and in mesquite and other woodland in washes which drain into the floodplain from the west. The extent to which the species occupies wooded washes well west of the Colorado River Valley proper is uncertain; certainly adequate mesquite and other desert microphyll woodland exists in drainages such as Milpitas Wash (Imperial Co.), McCoy Wash (Riverside Co.), and Chemehuevi and Piute washes (San Bernardino Co.).

*San Diego County*: There was no indication of breeding in the desert portion of the county as of the early 1980s, despite the occurrence of patches of mesquite in the Borrego Valley (Unitt 1984). However, Massey (1998) reports a breeding population at Mesquite Bosque, south of Borrego Springs in Anza-Borrego Desert State Park, beginning in 1990, with breeding first documented in 1993. High counts of seven singing males were obtained, and perhaps as many as 12 pairs breed in the area (P. Unitt, based on S D Co. BBA data).

*Imperial Valley*: Recorded breeding sporadically up to 1994-1995 when a pair bred ne. of Holtville (Robert L. McKernan, in Patten et al. 2002). The only recent records are of migrants: a single bird 3 mi. sw. of Brawley 14 July 2001, and singles at the south end of the Salton Sea 17 May 1969, 28 Sep 1974, and 27 Jul-22 Aug 1997 (Patten et al 2002).

*Riverside County*: Small numbers of breeding birds were established from the vicinity of Mecca at the north end of the Salton Sea to Thousand Palms Oasis (Garrett and Dunn 1981); the small colony around Mecca persisted until 1985 according to Robert L. McKernan (cited by Patten et al. 2002), and it is uncertain if any breeding birds remain in the CoachellaValley.

*San Bernardino County*: Small, localized breeding populations have been present at Big Morongo Canyon, in the vicinity of Barstow, around Baker, on the Amargosa River, and around Klinefelter (Garrett and Dunn 1981). The population at Big Morongo Canyon was first discovered

in 1969 (AFN 23:696), with 3-4 pairs estimated to be breeding there by 1971 (AB 25:907); it still exists, but it is uncertain how many of the other populations in the county are still extant. Recorded in spring and probably nesting at Camp Cady along Mojave River; excellent mesquite habitat exists here, although increasingly invaded by tamarisk. A survey in June 2001 along 30 km of the Mojave River between Mohave Narrows Regional Park and Helendale yielded three pairs; all were just downstream from the Victorville sewer plant (S. J. Myers in litt.).

*Inyo County*: The northernmost extent of the species' range in California is in the Death Valley region, with a few pairs breeding at Furnace Creek Ranch, Death Valley National Park (Garrett and Dunn 1981) and in the vicinity of Tecopa since at least 1972 (AB 26:907); also recorded breeding on the Amargosa River (on the San Bernardino County line; Small 1994).

**Ecological Requirements**

Grinnell and Miller (1944) indicate almost exclusive use of honey mesquite (*Prosopis glandulosa*) thickets in California, with warblers ranging secondarily into riparian growth, palo verdes, ironwood. Rosenberg et al. (1991) found wider habitat use along the lower Colorado River; although highest breeding densities were in honey mesquite, moderate densities occurred in saltcedar. Some geographical variation; in New Mexico nests mainly in mature willow-cottonwood riparian rather than mesquite bosques (Stoleson et al. 2000), and in the foothills of central and southeastern Arizona breeds in mixed woodlands of ash, walnut, sycamore and live oak (Phillips et al. 1964).

The Lucy's Warbler is one of only two parulids that regularly nests in cavities, and its populations are potentially impacted by a shortage of cavities where tall woody growth is destroyed. Nests may be behind loose bark, in natural cavities, in woodpecker-excavated cavities, or occasionally crevices in banks (Johnson et al. 1997); along the lower Colorado River these warblers especially use natural knotholes or partial cavities excavated by Ladder-backed Woodpeckers

(*Picoides scalaris*; Brush 1983). Their use of matted clumps of dead saltcedar leaves along the lower Colorado River (Rosenberg et al. 1991) suggests adaptation in nest site selection.

Rea (1983) found Lucy's Warblers nesting in a marsh area along the Gila River, Arizona, where old mesquite were drowned and *Sambucus* and *Tamarix* had taken over; in the Grand Canyon area of Arizona they have occupied recently created salt cedar (*Tamarix ramossissima*) habitat (Johnson et al. 1997). Thus, some degree of adaptation to non-natural woody vegetation is indicated. This species is almost exclusively insectivorous, gleaning foliage, twigs and flowers at low to middle heights (Johnson et al. 1997). Studies in Arizona, summarized by Johnson et al. (1997), show that nearly half of the diet consists of leafhoppers, with Coleoptera (beetles), Hymenoptera (wasps, ants), and Araneae (spiders) also important.

**Threats**

The loss or severe alteration of mesquite and other desert riparian habitat is certainly the major threat to this species in California. Clearing of mesquite for firewood and for agricultural and urban development in the Imperial and Coachella valleys has essentially eliminated this species from those areas. The impacts of destruction of mesquite on this species noted by authors as early as Grinnell (1914) and Dawson (1923). Even where mesquite and other desert riparian habitat persists, loss of habitat quality through invasive exotic plants (notably tamarisk, *Tamarix* spp.), grazing, human recreational impacts, and lowering of water tables can affect the warblers.

The increasing diversion of water for urban and agricultural uses threatens desert riparian ecosystems. A plan by the Metropolitan Water District to pump water from Mojave Desert aquifers, for example, could have severe impacts on mesquite habitats.

Brown-headed Cowbird parasitism of Lucy's Warblers has been documented (Johnson et al. 1997), even though the cavity/crevice nesting habit of Lucy's may provide some degree of immunity.

Lucy's Warblers may show more resilience and resistance to habitat modification than some southwestern riparian species such as Willow Flycatcher (*Empidonax traillii extimus*) and Bell's Vireo (*Vireo bellii arizonae* and *V. b. pusillus*) (Johnson et al. 1997).

The subset of the winter range that is occupied by California-breeding populations is not known, but presumably there are no major threats to scrub habitats in those regions.

**Management and Research Recommendations**

- Preserve and restore mesquite woodlands. The close association of this species with mesquite bosques suggests that management is best directed toward preservation and restoration of such habitats; threats to mesquite are many, but predominating is the outright clearing of this habitat for agriculture or urban development. Such clearing has been especially acute in the Coachella and Imperial valleys.
- Reduce disturbance to desert riparian habitats. Small riparian areas on the California deserts are subjected to a variety of disturbance factors, including invasive exotic plants (such as tamarisk/saltcedar), lowering of water tables, grazing, habitat damage by recreational vehicles and camping activity, etc. Desert springs and wetlands that support riparian habitat need complete protection.
- Ensure adequate availability of nest sites. This species evidently will not use nest boxes (Brush 1983). Monitoring, protection and enhancement of Ladder-backed Woodpecker populations could benefit Lucy's Warblers, since they often nest in cavities excavated by the former species.
- Control Brown-headed Cowbirds. Although brood parasitism by Brown-headed Cowbirds is infrequent, cowbird control efforts intended to benefit other species will have some residual benefits for Lucy's Warblers.

**Monitoring Needs**

BBS routes are generally not efficient at tracking trends in birds in desert riparian areas due to the linear nature of such habitat. Point count methods are best, augmented by constant-effort mist-netting. Small desert oases and mesquite bosques should be monitored annually, with some measure of productivity (and levels of parasitism by cowbirds) assessed.

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